the theory does assume; as, for instance, that all *particles*, whether of insulators or conductors, are, as *wholes*, conductors; that, being conductors, they can readily be charged either bodily or polarly; that contiguous particles being on the line of inductive action can communicate their forces more or less readily; that those doing so most readily constitute the bodies called *conductors*, and those doing so least readily those called *insulators*, &c.

Having thus given a brief summary of the conclusions drawn from the previous investigations, the author proceeds to consider the particular condition of the particles which, in an insulating body, are considered as polarized; and after showing that the theory requires that they should be able to polarize in any direction, he states his expectation that a greater facility to polarize in one direction than another would still be found to belong to them, and proceeds experimentally to determine this point. His experiments were made by observing the degree of inductive force across cubes of perfectly crystallized bodies, as rock crystal and Iceland spar; these being cut so as to have the axis of the crystal parallel to the line joining two opposite faces of the cube; but the experiments, which are laborious, require extension, and he has not as yet been able to prove or disprove the expected result.

The author then considers whether in compound bodies it is the ultimate and elementary particles or the compound particles which polarize as wholes. He concludes that it is the latter which assume that state; and shows how this point bears upon the electrolyzation of such bodies as are separated into simpler substances, or otherwise altered by the action of the voltaic current.

He then proceeds to certain experiments bearing upon the nature of the relation of the electric and magnetic forces, giving his view of the character of this relation; and concludes his paper by briefly stating what he thinks is more satisfactorily explained by the theory which refers inductive action to an action of contiguous particles than by the old theory.

"Experiments on the Vibration of the Pendulum." By W. J. Frodsham. Communicated by Francis Beaufort, Capt. R.N., F.R.S.

The object of this paper is to show the advantages that may result from attaching to the top of the pendulum a brass tube, which the author terms "an isochronal piece," about five inches in length, fitting the pendulum very nicely, and slit so as to form a spring for about an inch at the bottom, sliding rather stiffly on the rod, so that its position, and consequently its influence on the action of the pendulum, may be varied at pleasure; and that unequal arcs of vibration may be made to correspond to equal intervals of time.

"An Account of some Experiments on the Blood in connexion with the Theory of Respiration." By John Davy, M.D., F.R.S., Assistant Inspector of Army Hospitals.

The author has investigated, experimentally, several of the important questions connected with the theory of respiration and of

animal heat; and arrives at the following results. He finds that the blood is capable of absorbing oxygen both from atmospheric air, and from oxygen gas, independently of putrefaction. After blood has been agitated in common air, a trace of carbonic acid, not exceeding one per cent., is found in the residual air; but when pure oxygen is employed, no carbonic acid can be detected in it by the most carefully conducted trials. When pure carbonic acid is brought into contact with blood, or serum, over mercury, and moderately agitated, the absorption of gas exceeds the volume of the fluid. Both arterial and venous blood are rendered very dark, and serum more liquid by the absorption of this gas to saturation. Serum, in its healthy state, is incapable of absorbing oxygen, or of immediately furnishing carbon to form carbonic acid: and after it has absorbed carbonic acid, only one-tenth of the absorbed gas is expelled by successive agitation with atmospheric air, or with hydrogen. The author is inclined to think that the alkali in the blood, in its healthiest condition, is in the state of a sesquicarbonate. In the majority of trials manifest indications of the disengagement of air from blood *in vacuo* were obtained: but as it occasionally happened that no air could be thus extricated, the author is induced to believe that the quantity of air contained in the blood is variable: and he has found this air to consist solely of carbonic acid gas. It would also appear, from the experiments detailed in this paper, that a portion of oxygen exists in the blood, not capable of being extracted by the air-pump, yet capable of entering into combination with nitrous gas; and existing in largest proportion in arterial blood. The absorption of oxygen by blood is attended with an increase of temperature.

The experiments of the author tend to show that the lungs are absorbing and secreting, and perhaps also inhaling organs, and that their peculiar function is to introduce oxygen into the blood and separate carbonic acid from the blood: and they favour the idea that animal heat is owing, first, to the fixation or condensation of oxygen in the blood in the lungs during its conversion from venous to arterial; and secondly, to the combinations into which it enters in the circulation in connexion with the different secretions and changes essential to animal life.

"On the Geometrical Forms of Turbinated and Discoid Shells." By the Rev. H. Moseley, Professor of Natural Philosophy and Astronomy in King's College, London. Communicated by Thomas Bell, Esq., F.R.S.

This paper is occupied by an investigation of certain mathematical principles which the author considers as governing the formation of turbinated and discoid shells. According to these views, all such shells may be conceived to be generated by the revolution about a fixed axis of the perimeter of a geometrical figure, which, remaining always similar to itself, increases continually its dimensions. The spiral lines which are observable on the opercula of certain classes of shells, taken in connexion with the well-known properties of the